AD_____

Award Number: DAMD17-02-1-0055

TITLE: Preferences and Utilities for Prostate Cancer Screening and Treatment Assessment of the Underlying Decision Making Process

PRINCIPAL INVESTIGATOR: Deborah Watkins-Bruner, Ph.D.

CONTRACTING ORGANIZATION: Fox Chase Cancer Center
Philadelphia, Pennsylvania 19111

REPORT DATE: January 2007

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
01-01-2007	Final	1 Jan 2002 – 31 Dec 2006

4. TITLE AND SUBTITLE

Preferences and Utilities for Prostate Cancer Screening and Treatment Assessment of the Underlying Decision Making Process

5a. CONTRACT NUMBER

5b. GRANT NUMBER
DAMD17-02-1-0055

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Deborah Watkins-Bruner, Ph.D.

E-Mail: wbruner@nursing.upenn.edu

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Fox Chase Cancer Center
Philadelphia, Pennsylvania 19111

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Prospect Theory **(PT), with risk-attitudes, helps us understand decision making under conditions of r i s k and can be applied to decisions regarding prostate** cancer. **Other models have suggested that risk-perceptions may better explain risky choices. Aims: The** a i m **of** this **study was to assess the mechanism (risk-attitude vs. risk perceptions) by which risky choices (preferences) are made. Methods: Risk perceptions were assessed with a questionnaire** and **preferences were measured with the Time Trade-Off (TTO) interview. Results: 290 men, 144 with prostate cancer and 146 without, were randomized to either a loss or gain framed intesview. Our hypothesis that the mechanism driving risky *choice is* a combination of riskperceptions and risk-attitude was supported. Our hypothesis related to the effect *of* message framing on** preferences **was supported only in part** since **there** were **no within group differences, however message framing did show modestly significant** between **group (patient versus community) differences for loss and** gain **frame related to impotence but not** incontinence. **This study also supports PT** w i t h **patients willing to risk more side effects to gain longer** suwival **than community subjects. Conclurionr This study has begun to further elucidate the** role **risk-attitude and risk-perception play in decision making.**

15. SUBJECT TERMS
Prostate cancer, Decision making, *TTO,* Utilities, and Risk perceptions

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			USAMRMC
U	U	U	UU	11	**19b. TELEPHONE NUMBER** *(include area code)*

Table of Contents

V. Project Summary:

A. Introduction:

This study evaluated two different populations, a community sample without prostate cancer, and a group of men diagnosed and treated for prostate cancer. The study was designed to evaluate the decision-making mechanism (i.e., risk-attitude versus risk-perceptions) and processes (i.e., cognitive versus affective) that influence their preferences for specific treatments (e.g., surgery and radiotherapy) and associated health states (i.e., sexual impotence and urinary incontinence). In order to assess risk-attitude versus risk-perception two variables were considered, the point of reference of the subject (i.e. person with prostate cancer versus person without prostate cancer) and the way the treatment alternatives are communicated or framed (loss-framed message versus gain-framed message).

B. Body:

1. Objectives:

Aim 1: The proposed study will assess the mechanism (risk-attitude versus risk-perceptions) by which preferences are made for health outcomes.

Aim 2: The proposed study will asses potential mediators of risk attitude/perceptions, stated preferences and calculated utilities by assessing cognitive-affective factors individuals may weigh in making risky choices through the quantitative Risk Perceptions Questionnaire (conducted as part of the current analyses) *and the more qualitative Cognitive-Affective Mediating Units Questionnaire (to be analyzed in the future).*

Aim 3: The proposed study will assess differences in risk-attitude/perceptions, cognitive-affective profile, stated preferences, and calculated utilities among the groups studied.

C. Key Accomplishments:

- Our hypothesis that the mechanism driving risky choice is a combination of risk-perceptions and risk-attitude was supported with the combination shown to be significantly associated with preferences.
- Our hypothesis related to the effect of message framing on preferences was supported only in part since there were no within group differences, however message framing did show modestly significant between group (patient versus community) differences for loss and gain frame related to impotence but not incontinence.
- This study also supports PT with patients willing to risk more side effects to gain longer survival than the community subjects.
- Aim 3 is pending analysis.

D. Reportable Outcomes

Subject characteristics are presented in Table 1.

- There were sociodemographic differences between the patient and community samples.
- Patients were almost 10 years older than the community sample. The younger community sample had a higher percentage of college graduates and were more likely to be employed than the patient sample.

Table 1. Subject Characteristics – Means (SD) or N and Frequencies (%): N=290

	Patient N=144		**Community N=146**	
	Loss Frame N=71	Gain Frame N=73	Loss Frame N=71	Gain Frame N=75
Age in years pt vs community*	67 (SD 7.74) Range 51-79		58 (SD 10.63) Range 40-78	
Age in years within group by gain vs loss frame	68 (SD 7.46) Range 51-79	66 (SD 7.88) Range 51-79	57 (SD 10.41) Range 40-77	57 (SD 10.91) Range 40-78
Ethnicity pt vs community White Black Other	128 (89%) 15 (10%) 1 (1%)		139 (95%) 6 (4%) 1 (1%)	
Ethnicity within group by gain vs loss frame White Black Other	62 (87%) 8 (11%) 1 (2%)	66 (90%) 7 (10%) 0	68 (96%) 2 (3%) 1 (1%)	71 (95%) 4 (5%) 0
Education pt vs community^ ≤High School (HS) 0.□ HS to ≤ College Post Graduate	38 (26%) 76 (53%) 30 (21%)		15 (11%) 98 (71%) 33 (23%)	
Education within group by gain vs loss frame ≤High School (HS) 0.□ HS to ≤ College Post Graduate	20 (29%) 33 (46%) 18 (25%)	18 (25%) 43 (59%) 12 (16%)	11 (16%) 43 (60%) 17 (24%)	4 (5%) 55 (74%) 16 (21%)
Household Income				

before taxes last year pt vs community# ≤ $29,999 $30,000 - $74,999 0.□ $75,000 Refused	18 (13%) 57 (39%) 46 (32%) 23 (16%)		12 (8%) 52 (36%) 67 (46%) 15 (10%)	
Household Income within group by gain vs loss frame ≤ $29,999 $30,000 - $74,999 0.□ $75,000 Refused	8 (13%) 24 (34%) 23 (32%) 15 (21%)	9 (13%) 33 (45%) 23 (31%) 8 (11%)	6 (8%) 26 (47%) 29 (41%) 10 (14%)	6 (8%) 26 (35%) 38 (50%) 5 (7%)
Marital Status pt vs community Married Not Married	110 (76%) 34 (24%)		113 (77%) 33 (23%)	
Marital Status within group by gain vs loss frame Married Not Married	55 (77%) 16 (23%)	55 (75%) 18 (25%)	60 (85%) 11 (15%)	53 (71%) 22 (29%)
Work Status pt vs community¥ Working (FT /PT) Not Working	63 (44%) 81 (56%)		93 (64%) 53 (36%)	
Work Status within group by gain vs loss frame Working (FT /PT) Not Working	30 (42%) 41 (58%)	33 (45%) 40 (55%)	43 (61%) 28 (39%)	50 (67%) 25 (33%)

0.□ nonparametric Wilcoxon p-value p<.0001; ^Chi-square p-value p<.01; #Chi-square p-value p<.03; ¥Chi-square p-value p<.0001

Table 2 indicates:

- There are no significant within group (patient or community) differences in utilities for any risk of impotence or incontinence by loss or gain frame.
- There are modestly significant between group (patient versus community) differences for loss frame related to impotence but no significant between group difference related to incontinence.
- There are highly significant between group (patient versus community) differences for gain frame related to impotence but no significant between group differences related to incontinence.

Table 2. TTO Utilities (Mean and Standard Deviations) for 16-Yr Survival with Treatments Associated with Varying Probabilities of Symptoms versus Less Survival with Observation but No Treatment Related Symptoms

	Patient N=144		**Community N=146**		
	Loss Frame N=71	Gain Frame N=73	Loss Frame N=71	Gain Frame N=75	t-test p-value
Incontinence					
10% Risk between groups	0.95 (0.11)		0.92 (0.18)		0.09
10% Risk within groups	0.95 (0.12)	0.96 (0.10)	0.92 (0.20)	0.93 (0.16)	NS
20% Risk between groups	0.93 (0.13)		0.90 (0.19)		0.12
20% Risk within groups	0.92 (0.13)	0.93 (0.13)	0.90 (0.20)	0.90 (0.17)	NS
25% Risk between groups	0.90 (0.17)		0.88 (0.19)		0.39
25% Risk within groups	0.88 (0.12)	0.91 (0.15)	0.88 (0.21)	0.88 (0.18)	NS
Impotence					
30% Risk between groups	0.95 (0.11)		0.89 (0.16)		**0.0005**
30% Risk within groups	0.94 (0.13)	0.96 (0.08)	0.89 (0.19)	0.90 (0.13)	NS
45% Risk between groups	0.92 (0.14)		0.85 (0.18)		**0.0007**
45% Risk within groups	0.92 (0.16)	0.92 (0.12)	0.87 (0.20)	0.82 (0.16)	NS
60% Risk between groups	0.90 (0.15)		0.83 (0.19)		**0.0002**
60% Risk within groups	0.90 (0.16)	0.90 (0.14)	0.84 (0.21)	0.82 (0.17)	NS

Table 3 shows the results of the multivariate analyses to assess predictors of preferences for treatment-related side effects for prostate cancer. The following variables were entered into the model; group, age, ethnicity, education, marital status, and each of the risk perception subscale sores A through E.

- For incontinence at any level of risk tested (10%, 20%, 25%), there was a weak association with ethnicity, with Caucasians having a higher utility for incontinence than other ethnicities.
- Risk perceptions as measured by the risk perceptions (RP) questionnaire using the bladder-related subscale (subscale D) (RPD) showed that having a higher score, meaning perceiving bladder-related issues to be of less risk for interfering with one's life, was associated with higher utility for bladder-related symptoms. This was unrelated to age, education or marital status or whether we asked men with or without prostate cancer. This was also unrelated to the other RP subscales including being diagnosed with prostate cancer (subscale A) (RPA), being treated with surgery (subscale B) (RPB), being treated with radiation therapy (subscale C) (RPC), or facing varying risks of impotence (subscale E) (RPE).
- For impotence at all levels of risk tested (30%, 45%, 60%), patients had a significantly higher utility for this symptom compared to the community sample. Risk perceptions as measured by the risk perceptions (RP) questionnaire using the radiation therapy subscale (subscale C) (RPC) were negatively associated with utility scores, meaning the more subjects perceived having radiotherapy as negatively impacting their lives the more they showed a tolerance for impotence. The bladder-related subscale (subscale D) (RPD) showed that having a higher score, meaning perceiving bladder-related issues to be of less risk for interfering with one's life, was associated with higher utility for incontinence. This was unrelated to age, education or marital status or to risk perceptions related to being diagnosed with prostate cancer (subscale A) (RPA) or being treated with surgery (subscale B) (RPB). For a 45% and 60% risk of impotence how subjects perceived erectile dysfunction impacting their life as measured by the sexual function-related subscale (subscale E) (RPE), also was associated with their preferences. Again higher risk perceptions scores were associated with higher utility scores.

Table 3. Stepwise Multivariate Regression Models for Predictors of Preferences for Treatment Alternatives with Attendant Risks of Impotence and Incontinence

Variable	Parameter Estimate ± SE	R^2	F	p-value
Incontinence				
10% risk		**.064**		
Intercept	0.712 (0.06)		126.62	<.0001
Ethnic (White)	0.064 (0.04)		2.23	0.14

RPD	0.0002 (<0.001)		15.03	0.0001
20% risk		**.080**		
Intercept	0.644 (0.07)		96.08	<0.0001
Ethnic (White)	0.083 (0.05)		3.46	0.06
RPD	0.0003 (<0.001)		18.73	<0.0001
25% risk		**.084**		
Intercept	0.585 (0.07)		68.76	<0.0001
Ethnic (White)	0.10 (0.05)		4.38	0.04
RPD	0.0003 (<0.001)		18.98	<0.0001
Impotence				
30% risk		**.102**		
Intercept	0.803 (0.04)		417.98	<0.0001
Patient	0.069 (0.02)		13.76	0.0003
RPC	-0.0001 (<0.0001)		2.89	0.09
RPD	0.0002 (<0.0001)		15.25	0.0001
45% risk		**.105**		
Intercept	0.736 (0.05)		231.31	<0.0001
Patient	0.07 (0.02)		10.03	0.0017
RPC	-0.0002 (0.0001)		4.40	0.04

RPD	0.0002 (<0.0001)		5.29	0.02
RPE	0.0002 (<0.0001)		6.59	0.01
60% risk		**.118**		
Intercept	0.708 (0.05)		195.45	<0.0001
Patient	0.072 (0.02)		9.91	0.0019
RPC	-0.0002 (0.0001)		5.30	0.02
RPD	0.0001 (<0.0001)		2.89	0.09
RPE	0.0002 (<0.0001)		12.15	0.0006

Note: All variables left in the model are significant at the 0.1500 level.

E. Conclusions: In a sample of 290 men, 144 patients (mean age 67) with prostate cancer and 146 community subjects (mean age 58) without prostate cancer, subjects were randomized to a loss or gain message-framed measure of preference and utility for health states related to prostate cancer. Our preliminary analysis supports our hypothesis that the mechanism driving risky choice is a combination of risk-perceptions and risk-attitude, rather than the traditional concept of EU risk-attitude alone. This is demonstrated in the multivariate analyses where risk perceptions were shown to be significantly associated with preferences and utility values for prostate cancer therapies and treatment related side-effects. Our hypothesis related to the effect of message framing on preferences was supported only in part. Message framing had no effect on preferences among patient groups or among community groups, however message framing did show modestly significant between group (patient versus community) differences for loss frame and for gain frame related to impotence but no significant between group difference for message framing related to incontinence.

This study also supports Prospect Theory (PT) which suggests that people avoid risks in the domain of gains and seek risks in the domain of losses relative to a change from their reference point. Kahneman & Tversky (K&T) (1979) proposed an S-shaped preference function that, relative to the reference level (the point of inflection), is concave in the domain of gains and convex in the domain of losses. This phenomenon has traditionally been associated with *risk attitude*, risk-aversion explaining the concavity and risk-seeking explaining the convexity. The current study supports this with the findings that patients have higher utilities for treatment options and associated side-effects than the community subjects. This means that patients, as we hypothesized based on PT, were more risk-seeking (would risk more side effects to gain longer survival) than the community subjects who were more risk-averse in their gambles.

F. References: None at this time.

G. Appendices: None at this time.